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(54) [Title of the Invention] PAPER DIAPER VACUUM PACKING METHOD

(57) [Abstract]

[Problem to be Solved] To provide a paper diaper vacuum packing method which is clean and hygienic easing the burden of a caretaker and which can alleviate the problems of an aging society and environmental pollution by reducing the bulkiness of diapers thereby decreasing the number of garbage bags and the volume of garbage being collected and preventing unpleasant smell and generation of bacteria from the garbage bags, which are kept at home or stored in a garbage collection station.

[Means to Solve the Problem] This relates to a method for vacuum packing paper diaper S wherein used paper diaper S is stored in bag H made of a nonporous material, the air of said bag H is evacuated so that the inside of said bag H forms a vacuum state, and said vacuumed bag H is sealed off. According to this method, a nearly cylindrical shape of deaerating pipe P is mounted on or inserted in the area of opening 1 of said bag H towards the center of said bag H into the inside of said bag H, with the one end of said deaerating pipe P being air inlet 3 covered with filter 2 and the other end being air outlet 4 leading to the outside of said bag H. Hole 5 covered with filter 6 is created at the center of said deaerating pipe P. The outlet of the air inside said bag H is made through said deaerating

pipe P. The area of opening 1 of said bag H, from which the air is evacuated, is welded to said deaerating pipe P.

1 ... opening

2 ... filter

3 ... air inlet

4 ... air outlet

5 ... hole

6 ... filter

H ... bag

P ... deaerating pipe

S ... paper diaper

[What is Claimed is]

[Claim 1]

A method for vacuum packing paper diapers wherein;
used paper diapers are stored in a bag made of a nonporous material, the air of said bag is evacuated so that the inside of said bag forms a vacuum state, and said vacuumed bag is sealed off, characterized in that a nearly cylindrical shape of deaerating pipe is mounted on or inserted from the area of the opening of said bag towards the center of said bag into the inside of said bag, with the one end of said deaerating pipe being an air inlet covered with a filter and the other end being an air outlet leading to the outside of said bag, a hole covered with a filter is created on the center of said deaerating pipe, the outlet of the air inside said bag is made through said deaerating pipe, and the area of the opening of said bag, wherein the air is evacuated, is welded to said deaerating pipe.

[Claim 2]

The method for vacuum packing paper diapers, as set forth in claim 1, characterized in that said bag is vacuum-packed by a device comprising:

a chamber capable of sealing off;

a method for evacuating the air inside said chamber; and

a method for welding the area of the opening of said bag by applying heat.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention relates to a method for vacuum packing paper diapers wherein used paper diapers are vacuum packed.

[0002]

[Description of the Prior Art]

For example, conventionally, paper diapers after being used at home or in hospitals by infants, physically-disabled people, adults or elderly people who need assistance due to sickness or accidents are discarded directly into garbage bags. Thick absorber material which absorbs waste material is built in these paper diapers, and furthermore, the volume of the used paper diaper usually expands about two times that of the paper diaper before use.

[0003]

Moreover, garbage collection day is usually regulated as about twice a week and the amount of paper diapers accumulated before the garbage collection day (3 to 5 days) is 20 bags or

more in the case of an adult and elderly person since each person changes his/her paper diaper 5 - 6 times a day. This is equivalent to 2.5 garbage bags.

[0004]

Furthermore, if a garbage bag containing paper diapers is kept at home until the garbage collection day, an unpleasant odor or bacteria can be easily generated from the garbage bag. In reality, caretakers worry themselves about the storage place of the garbage bag where paper diapers are stored. Especially, since the government encourages home-nursing care, the disposal of paper diapers at home will be a significant issue in the future.

[0005]

[Problem to be Solved by the Invention]

As described above, since the aforementioned paper diaper has a thick absorbing material and the thickness of the used paper diaper expands about two times that of the diaper before use and especially, in the case of an adult and elderly person, the amount of paper diapers used per day is large, it is necessary to have a wide space for storing the used paper diapers which are accumulated by garbage collection day. Furthermore, as the amount of the used paper diapers becomes larger, the number of the garbage bags becomes greater thereby

increasing the volume of the garbage being collected.

[0006]

Moreover, if a garbage bag containing paper diapers is stored at home until the garbage is collected and the garbage bag is left in the garbage collection station, an unpleasant odor and bacteria can be easily generated from the garbage bag and the situation becomes unclean and unsanitary. Therefore, the disposal of used paper diapers is a significant issue for those who are engaged in home-nursing care and is a new challenge for an aging society and for environmental pollution.

[0007]

The present invention is created with attention to the above described matter and the objective of the present invention is to provide a paper diaper vacuum packing method which is clean and hygienic, easing the burden of a caretaker, and can alleviate the problems of an aging society and environmental pollution by reducing the bulkiness of diapers, thereby decreasing the number of garbage bags and the volume of garbage being collected and preventing the unpleasant odor and generation of bacteria from the garbage bags, which are kept at home or stored in a garbage collection station.

[0008]

[Means to Solve the Problem]

In order to achieve the above described objective, in the paper diaper vacuum packing method of the present invention, used paper diapers are stored in a bag made of a nonporous material, the air of said bag is evacuated so that the inside of said bag forms a vacuum state, and said vacuumed bag is sealed . A nearly cylindrical shape of deaerating pipe is mounted on or inserted from the area of the opening of said bag towards the center of said bag into the inside of said bag, with one end of said deaerating pipe being an air inlet covered with a filter and the other end being an air outlet leading to the outside of said bag. A hole covered with a filter is created on the center of said deaerating pipe. The outlet of the air inside said bag is made through said deaerating pipe, and the area of the opening of said bag, wherein the air is evacuated, is welded to said deaerating pipe (claim 1).

[0009]

Furthermore, said bag may be vacuum packed by a device comprising a chamber capable of sealing off, a method for evacuating the air inside said chamber and a method for welding the area of the opening of said bag by applying heat (claim 2).

[0010]

With the above described structure, it is possible to provide a paper diaper vacuum packing method which is clean and

hygienic, easing the burden of a caretaker and alleviating the problems of an aging society and environmental pollution by reducing the bulkiness of diapers, thereby decreasing the number of garbage bags and the volume of garbage being collected and preventing the unpleasant odor and generation of bacteria from the garbage bags, which are kept at home or stored in a garbage collection station.

[0011]

[Embodiments of the Invention]

Embodiments of the present invention will be described below by referring to drawings. Figures 1 and 2 are the cross-sectional view and the enlarged perspective view of substantial parts, which schematically illustrates the structures of bag H and device D with which the paper diaper vacuum packing method of the embodiment 1 of the present invention is implemented. The paper diaper vacuum packing method of the present invention is a method for hygienically sealing off and disposing by using a novel nozzle (straw) suction method. More particularly, this method is used for storing used paper diaper S in bag H and vacuum packing bag H by device D.

[0012]

The aforementioned bag H is made of nonporous material capable of being welded by applying heat, which is, for example,

made by laminating aluminum on a thin resin material, and blocks odor or air. A nearly cylindrical shape of deaerating pipe P is mounted on or inserted from opening 1 of bag H towards the bottom of the bag into the inner wall of the bag. Here, the aforementioned deaerating pipe P is, for example, made of resin straw capable of hygienically sealing off. In the case where deaerating pipe P is mounted on the inside of bag H, it may be fixed with, for example, adhesive agents or adhesive tapes.

[0013]

One end of the aforementioned deaerating pipe P which is located in the bottom of the aforementioned bag H is air inlet 3 covered with filter 2 and the other end which is located in opening 1 is air outlet 4 which leads to the outside of bag H. Also, a plurality of small holes 5 are placed in the center of deaerating pipe P and all of holes 5 are covered with filter 6. Here, the aforementioned filters 2 and 6 have structures which can let air through, but block waste matter.

[0014]

The aforementioned device D comprises chamber 7 capable of sealing off, which has lid 7' in the upper part, which is capable of opening and closing; air evacuation means 8 for evacuating the air from chamber 7 so that the inside of chamber

7 becomes a vacuum; and welding means 9 for welding the area of opening 1 of the aforementioned bag H by applying heat.

[0015]

The aforementioned chamber 7 comprises concave part 10 and heater part 11 mounted on the inside of concave part 10. The aforementioned heater part 11 comprises electrically operated heater 12, made of materials such as ceramics, with a moving mechanism 13 for vertically moving heater 12 and a cover (not shown in the figure) mounted on the upper side of the aforementioned heater 12 having a gap at the center. Here, the aforementioned heater 12 is supported by the aforementioned moving mechanism 13 having the structure wherein the temperature goes up when the electricity is turned on.

[0016]

Seal member 15, which is nearly rectangular in shape, in a plan view, is mounted on the bottom surface of lid 7'. Chamber 7 has seal member 16 which is mounted in the place where the aforementioned seal member 15 meets seal member 16 when lid 7' is closed. Chamber 7 is sealed off by putting together two seal members 15 and 16.

[0017]

The aforementioned air evacuation means 8 comprises air outlet 17 mounted on the inside of chamber 7, pump 19 which is

communicated with air outlet 17 through hose 18 and air suction motor 20. By driving the aforementioned air suction motor 20 controlled by a control circuit which is not shown in the figure, the air from the inside of chamber 7 is suctioned.

[0018]

The aforementioned welding means 9 comprises pressing member 21 mounted on the bottom surface of the aforementioned lid 7' and heater part 11 mounted on the inside of the aforementioned chamber 7. Here, the aforementioned pressing member 21 is a long member made of materials which have flexibility, resilience and heat-resistance such as a sponge.

[0019]

Next, the procedure for vacuum packing paper diaper S will be described by using Figure 3. First, as shown in Figure 3(A), paper diaper S and deaerating pipe P are inserted in this order into bag H so that they are stored in a state shown in Figure 3(B). Here, in the case that the aforementioned deaerating pipe P is placed in advance in the inside of bag H, only paper diaper S is inserted into bag H. Also, air outlet 4 of deaerating pipe P may be located projecting outward from opening part 1 of bag H or in the inside of bag H slightly inward from opening part 1 or in nearly the same place as opening part 1.

[0020]

Then, as shown in Figure 3(C), bag H in the above described storage state is inserted into chamber 7 of device D so that opening part 1 is located in the back from the place where the aforementioned welding means 9 is mounted. In this state, lid 7' is closed and the area of opening part 1 is sealed off by seal members 15 and 16. Here, the sole air passage from bag H to chamber 7 is deaerating pipe P. If the above described procedure is followed, by turning on a switch (not shown in the figure) of device D, it is possible to create a state wherein bag H containing paper diaper S can be vacuum packed.

[0021]

After bag H is put in the above described state and the switch of device D is turned on, a source pilot lamp (not shown in the figure) blinks and the air inside of bag H starts to evacuate. Here, by evacuating the air inside of chamber 7 by air evacuation means 8, the inside of chamber 7 comes under negative pressure and a force to close the aforementioned lid 7' is added. Therefore, lid 7' of device D does not open without creating a means for locking lid 7' in a state of complete closure. Obviously, creating such a locking means may be possible.

[0022]

In this way, after the evacuation of the air inside of bag H is finished, opening part 1 of bag H automatically starts being welded by welding means 9. That is, with the end of a predetermined air evacuation of bag H, heater 12 which has been in a downward position is elevated by moving mechanism 13 to weld the area of opening part 1 of bag H together with deaerating pipe P. Here, the aforementioned heater 12 has been heated since the electricity is turned on so that the above described welding process can be started immediately. Furthermore, while the above described welding is occurring, the air evacuation by the aforementioned air evacuation means 8 is continued and with the end of the aforementioned welding, the air evacuation is controlled to finish automatically. Therefore, in order to vacuum pack paper diaper S, caretakers just have to put the used paper diaper S into bag H and set up bag H in device D. As described above, after the welding and air evacuation processes finish, the lighted source pilot lamp is turned off thereby informing the users of the end of the vacuum packing process of bag H.

[0023]

Here, in the operation of the aforementioned device D, when the welding process finishes, the temperature rise of the

aforementioned heater 12 may be set to stop or continue.

Alternatively, one can choose whether it stops or continues.

[0024]

By conducting the above described operation wherein the air inside of bag H is evacuated so that bag H is vacuum packed, as shown in Figure 3(D), it is possible to compress paper diaper S and dispose bag H without the bulkiness of paper diaper S. Furthermore, it is possible to prevent the generation of unpleasant odor and bacteria from bag H.

[0025]

Moreover, because of filter 2 mounted on air inlet 3 of deaerating pipe P and filter 6 mounted on the center part, the waste matter in paper diaper S are not absorbed into device D and the inside of device D is always clean and hygienic. In addition, even if filthy matters are deposited in deaerating pipe P, it is possible to dispose bag H in a state where paper diaper S is integrated with deaerating pipe P. Therefore, bag H can be always disposed cleanly and hygienically.

[0026]

Furthermore, a plurality of holes 5 is mounted on the aforementioned deaerating pipe P. Therefore, when the air is evacuated from bag H, deaerating pipe P absorbs paper diaper S. Even if some of the aforementioned holes 5 are blocked up by

paper diaper S, the air can be evacuated from bag H through other holes 5. Therefore, it is possible to always conduct a smooth vacuum processing.

[0027]

Figure 4 is a perspective view schematically illustrating an example of changed forms of the aforementioned bag H and deaerating pipe P. 22 is a filter made of the same material as the aforementioned filter 6, which is shaped in a near rectangle in a plan view. Three sides of filter 22 are fixed to the inner wall of bag H with adhesive agents (or they may be welded by applying heat) and space 23 is created by filter 22 and bag H. The aforementioned deaerating pipe P can be inserted into space 23 through opening part 22' placed around opening part 1 of filter 22. Here, deaerating pipe P which is inserted into bag H having filter 22 may not have the aforementioned filters 2 and 6.

[0028]

By using bag H which has filter 22 having the above described structure, deaerating pipe P can be easily installed in bag H.

[0029]

As shown in Figures 3 and 4, when bag H is made in a shape wherein both sides of bag H are folded in, it is easy to spread

out opening part 1 of bag H, and consequently, it is easy to put used paper diaper S into bag H.

[0030]

Figures 5(A) and (B) are the perspective view and the cross-sectional view schematically illustrating another example of changed forms of the aforementioned deaerating pipe P. The structure and effect of deaerating pipe P of Figure 5 are almost the same as those of deaerating pipe P of Figure 2. The difference is that the aforementioned filter 6 is not attached to the entire outer circumference of deaerating pipe P, but overlap widths 6' are created in both sides of filter 6. With overlap widths 6' being attached or welded by applying heat, filter 6 is fixed to deaerating pipe P, and furthermore, filter 6 is put in bag H of deaerating pipe P by attaching the aforementioned overlap widths 6' to bag H or welding it by applying a heat. In this way, by using overlap widths 6', filter 6 can be easily fixed to deaerating pipe P and deaerating pipe P can be easily fixed to bag H.

[0031]

Figures 6 and 7 are the perspective view and the enlarged cross-sectional view of substantial parts schematically illustrating the structures of bag H and device D₂ for implementing the paper diaper vacuum packing method of

embodiment 2 of the present invention. Here, parts and members having the same structures as those of the above described embodiment 1 have the same codes thereby omitting their descriptions. The structures and effects of bag H and device D₂ for implementing the paper diaper vacuum packing method of embodiment 2 are almost the same as those of embodiment 1. The different points are that device D becomes device D₂ in embodiment 2, wherein storage part 24 for storing bag H containing paper diaper S is created beneath chamber 7.

[0032]

Since device D₂ has storage part 24 inside, it is possible to store bag H containing a plurality of used paper diapers S in storage part 24 and vacuum pack paper diapers S after storing a predetermined amount of paper diapers S inside. Therefore, it is possible to vacuum pack a plurality of paper diapers S at once, thereby bringing down the cost. Also, if paper diaper S is stored in bag H without being vacuum packed, smell and the like might leak to the outsides. If bag H is stored in the aforementioned storage part 24 by supporting opening part 1 of bag H together with lid 25 capable of opening and closing, which is mounted on the anterior part of storage part 24, and area 25' of lid 25, it is possible to prevent smell from used paper

diapers S, which are stored in bag H, from leaking to the outside.

[0033]

Here, welding means 8 of device D_2 is mounted on the outside of the aforementioned chamber 7. Also, 14 is a cover having gap 14' in the center, 26 is a switch which is described in the aforementioned embodiment 1 and 27 is a source pilot lamp.

[0034]

In addition, in the aforementioned embodiment 1, if bag H is closed by a stopper (not shown in the figure) with which opening part 1 of bag H can be closed and sealed off, device D can obtain the same effect as the aforementioned device D_2 .

[0035]

Since devices D and D_2 , comprising the aforementioned structure, have cover 14 having gap 14' in the center, by putting bag H together with gap 14', bag H can be welded by heater 12 which is placed beneath gap 14'. At the same time, gap 14' is made to proper size so that fingers of a user do not get in from gap 14'. Furthermore, heater 12 moves to the vicinity of gap 14' only when bag H is welded by welding means 8. At other time heater 12 is kept beneath gap 14'. Because of the above described structure, it is possible to most surely

prevent the user from touching heater 12 and he or she can safely use device D or device D₂.

[0036]

Moreover, in devices D and D₂ comprising the above described structure, heater 12 starts to be heated when the electricity is turned on and the temperature of heater 12 becomes sufficiently high when the air evacuation of bag H finishes. In this way, since the temperature of heater 12 is set in terms of time, it is possible to smoothly conduct the vacuum packing process of bag H without any time loss. Here, the temperature setting of the time when the temperature of the aforementioned heater 12 is going up may be changed accordingly, depending on the types of material used for making bag H.

[0037]

Furthermore, in devices D and D₂ comprising the above described structure, since heater 12 is electrically operated, the maintenance becomes easy, thereby bringing down the cost.

[0038]

The structure of the aforementioned devices D and D₂ are not limited to the above described one. If the air inside of bag H can be suctioned through the aforementioned deaerating pipe P, the structure of devices D and D₂ does not have to be the chamber system. For example, the air may be evacuated from bag H through

deaerating pipe P by using a tube. Furthermore, devices D and D₂ may have a structure wherein, by putting pressure from the circumference of bag H, the air is evacuated only through deaerating pipe P. Also, they may have a structure wherein, packing of bag H may be replaced with welding by heater 12 and opening part 1 of bag H can be tied with a string and the like, or opening part 1 of bag H is directly tied.

[0039]

In the above described two embodiments, for example, deoxidizer can be enclosed in bag H.

[0040]

In the above described two embodiments, if deaerating pipe P is made with, for example, commercially-available resin straw, the cost can be reduced.

[0041]

According to the paper diaper vacuum packing method having the above described structure, it is possible to dispose the aforementioned bag H in a vacuum packed state. Therefore, unpleasant odor does not leak from bag H preventing dogs and cats from detecting the smell and tearing up bag H and it is hygienic. Furthermore, people engaged in waste material collection suffer from problems of smells and infections of diseases caused by disposal of used paper diapers, but according

to the paper diaper vacuum packing method of the present invention, it is possible to solve these hygiene problems.

[0042]

[Effects of the Invention]

According to the present invention having the above described structure, it is possible to provide a paper diaper vacuum packing method which is clean and hygienic, easing the burden of a caretaker and can alleviate the problems of an aging society and environmental pollution by reducing the bulkiness of diapers thereby decreasing the number of garbage bags and the volume of garbage being collected and preventing unpleasant odor and generation of bacteria from the garbage bags, which are kept at home or stored in a garbage collection station.

[Brief Description of the Drawings]

[Figure 1]

Figure 1 is a cross-sectional view schematically illustrating the structures of the bag and device for implementing the paper diaper vacuum packing method of embodiment 1 of the present invention.

[Figure 2]

(A) and (B) are perspective views schematically illustrating the deaerating pipes of the aforementioned

embodiment, one showing the pipe before the filter is placed in the pipe and the other, after the filter is placed in the pipe.

[Figure 3]

(A) and (B) are perspective views schematically illustrating the state of the bag before and after the paper diaper is stored according to the above described embodiment. (C) is a cross-sectional view schematically illustrating the state of the bag wherein the air is evacuated from the bag containing the paper diaper by the device. (D) is a perspective view schematically illustrating the structure of the bag after the air is evacuated.

[Figure 4]

Figure 4 is a perspective view schematically illustrating the structure of an example of changed forms of the bag and the deaerating pipe of the above described embodiment.

[Figure 5]

(A) and (B) are a perspective view and a cross-sectional view, schematically illustrating another example of changed forms of deaerating pipe P of the above described embodiment.

[Figure 6]

Figure 6 is a perspective view schematically illustrating the structures of the bag and the device for implementing the

paper diaper vacuum packing method of embodiment 2 of the present invention.

[Figure 7]

Figure 7 is a cross-sectional view schematically illustrating the structures of the bag and the device of the above described embodiment.

[Explanation of the Codes]

1 ... opening part

2 ... filter

3 ... air inlet

4 ... air outlet

5 ... hole

6 ... filter

H ... bag

P ... deaerating pipe

S ... paper diaper

[Figure 1]

[Figure 2]

[Figure 3]

1 ... opening part

2 ... filter
3 ... air inlet
4 ... air outlet
5 ... hole
6 ... filter
H ... bag
P ... deaerating pipe
S ... paper diaper

[Figure 4]

[Figure 5]

[Figure 6]

[Figure 7]